MELANOGASTER[1]

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Owing to pressure of other work, there seems little opportunity for further study of the Hymenogasteraceae *(sensu latiore)* in the near future; consequently it seems well to present *Melanogaster* at this time without the small related genera of which we have seen little or no material. While the common European species are well represented in the larger herbaria, there are several species of doubtful affinity of which the types have been lost and which are known to us only from the original descriptions. We have included these, however, in the hope that they may be again encountered.

As in previous papers, we have used the same color standards and cited the specimens studied with the same abbreviations. For financial assistance we are grateful to the American Association for the Advancement of Science (grant in 1923 to the senior author), to the John Simon Guggenheim Memorial Foundation which appointed the junior author a fellow to Europe in the autumn in 1930, and to the Science Research Fund of Washington University (grant of 1933 to the junior author).

MELANOGASTER

Melanogaster Corda in Sturm, Deutschl. Fl. III. **19**: 1. 1831; Icones Fung. **5**: 23. 1842.

[1] Published as Technical Paper No. 256 with the approval of the Director of the Oregon Agricultural Experiment Station. Contribution from the Department of Botany in cooperation with the Henry Shaw School of Botany of Washington University.

Issued January 8, 1937.

Bullardia Junghuhn, Linnaea **5**: 408. 1830.—*non Bulliarda* Necker, Elem. **2**: 321. 1790; DC. Bull. Soc. Philomath. **3**: 1. 1801.

Octaviania Vittadini, Monogr. Tuberac. 15–20. 1831.

Argylium Wallroth, Fl. Cryptog. Germ. **2**: 874. 1833.

Hymenogaster Endlicher, Gen. Pl. 30. 1836.—*non al.*

?Uperhiza Bosc, Ges. Naturf. Freunde Berlin Mag. **5**: 88. 1811 (without species name); Nees, Syst. d. Pilze **1**: 159; **2**: 41, *pl. 15, f. 146.* 1816 (as *U. carolinensis*).

?Uperrhiza Fries, Syst. Orb. Veg. **1**: 135. 1825.

?Hyperrhiza Sprengel in Linné, Syst. Veg. ed. 16, **4**: 416. 1827.

The type of *Melanogaster* is *M. tuberiformis* Corda. *Bullardia* was based on *B. inquinans* Jungh., usually considered a synonym of *M. variegatus* (Vitt.) Tul. *Bullardia* has universally been considered a variant spelling of *Bulliarda* and hence preoccupied. We have not seen type material, and prefer to regard it as a permanent source error. We have not recognized the specific epithet, *B. inquinans,* following the universal practice of the last century. *Octaviania* was based on *Octaviania variegata* Vitt. *Argylium* Wallr. is based on *Bullardia inquinans* Jungh. *Uperhiza* and its variant spellings are all based on *U. carolinensis* Nees. This genus name was frequently used up to 1844 as a synonym of *Melanogaster* and of course antedates it. A careful reading of the Bosc and the Nees descriptions suggests that this is rather a species of *Scleroderma* but it is too poorly described to place in the absence of type specimens which have evidently been lost for at least a century. It seems unwise to overturn the nomenclature of the greater part of a century when, in the absence of adequate description or type, it may become a permanent source of confusion. We hereby recommend that *Melanogaster* be conserved against *Uperhiza* and its variant spellings, *Uperrhiza,* and *Hyperrhiza.*

Fructifications subspherical to irregular, usually brownish to blackish, at least at maturity, surface even, dull, usually with strong odors; fibrils usually present, often inconspicuous; peridium mostly prosenchymatous, sometimes with vesiculose cells, often not well differentiated from the septa of the gleba,

not separable; gleba usually dark brown becoming black in age with tendency to deliquesce, with whitish septa which may become discolored yellowish or reddish on wounding or in age, cavities filled by a gel containing the evanescent basidia and the spores; septa of gelified prosenchyma, often with traces of the fundamental tissue; basidia mostly clavate, evanescent, scattered throughout the gel of the cavities, borne singly on branching hyphae, 4–8-spored, sterigmata short and often very broad, so that the spores appear sessile on the basidium; spores brown, occasionally yellow, variable in shape from subspherical to subcylindric, usually with a thick epispore.

Confined to the more humid portions of the north temperate zone, except for one species from the mountains of Northern India and one species in New Zealand.

KEY TO THE SPECIES OF MELANOGASTER

1. Spores averaging more than 11 μ in length 2
1. Spores averaging less than 11 μ in length 5
   2. Spores citriform to almost fusiform, sometimes bluntly apiculate ..... *1. M. ambiguus* (p. 642)
   2. Spores obovoid 3
3. Spores large, 15–18 μ long ..... *2. M. macrosporus* (p. 644)
3. Spores smaller 4
   4. Spores 11–13 × 7.4–8 μ ..... *3. M. intermedius* (p. 645)
   4. Spores 10–11.5 × 5.5–7 μ ..... *4. M. tuberiformis* (p. 645)
5. Spores 10–11 μ long 6
5. Spores shorter 7
   6. Spores more than 7 μ broad ..... *1a. M. ambiguus* var. *euryspermus* (p. 643)
   6. Spores 5.5–7 μ broad ..... *4. M. tuberiformis* (p. 645)
7. Spores small, less than 5 μ long ..... *5. M. microsporus* (p. 646)
7. Spores longer 8
   8. Spores oblong to cylindrical 9
   8. Spores ellipsoid, ovoid, or subspheroid 10
9. Spores definitely truncate below, 6–8.4 × 3.5–4 μ, rather dark *sub lente* ..... *6. M. Broomeianus* (p. 647)
9. Spores rounded at both ends, 8–9.6 × 5.5–6.5 μ, almost hyaline *sub lente* ..... *7. M. rubescens* (p. 648)
   10. Gleba drying brown or brownish-black, spores rather dilute brown or yellowish 11
   10. Gleba drying black, spores dark brown, ellipsoid or obovoid 12
11. Spores broadly ovoid or subspheroid, 8–9.6 × 6.7–7.7 μ ..*8. M. Parksii* (p. 649)
11. Spores ovoid, ellipsoid to fusiform, somewhat truncate below, 8–9.6 × 5.5–6 μ ..... *7. M. rubescens* (p. 648)
   12. Spores less than 4 μ broad, 5.5–6.7 × 2–3.7 μ ..... *9. M. mollis* (p. 650)
   12. Spores 4 μ or more broad 13

13. Spores truncate, 6–8 × 4–5 μ, exospore conspicuous..*10. M. durissimus* (p. 650)
13. Spores not truncate, 7.5–10.3 × 5–7.5 μ, exospore not conspicuous.....
.....*11. M. variegatus* (p. 651)

1. MELANOGASTER AMBIGUUS (Vittadini) Tulasne, Ann. Sci. Nat. Bot. II. **19**: 378. 1843.

Octaviania ambigua Vittadini, Monogr. Tuberac. 18. 1831.

Hyperrhiza liquaminosa Klotzsch in Dietrich, Fl. Reg. Boruss. [Fl. Königr. Preuss.] **7**: no. 468. 1839.

Argylium liquaminosum Wallroth, Fl. Cryptog. Germ. **2**: 874. 1833.

Melanogaster Klotzschii Corda, Icones Fung. **5**: 23. 1842; Anleit. z. Stud. Myc. 95. 1842.

Illustrations: Vittadini, Monogr. Tuberac. *pl. 4, f. 7.*

Type: location unknown to us but specimen so determined in Broome Herb. at British Museum. *Argylium liquaminosum* from Thüringen, *Wallroth.*

Fructifications subspherical to ellipsoidal, 1–3.5 cm. in diameter, pale olive to olivaceous-brown when fresh, becoming cinnamon-brown to Prout's brown on drying, surface cottony-furfuraceous, fibrils scanty, inconspicuous; peridium 300–600 μ thick when fresh, somewhat thinner in old dry material, hyaline within, yellowish-brown toward surface, prosenchymatous, homogeneous, with outer filaments fraying out to form the more or less erect, brown tomentellum at the surface, of large, thick-walled, agglutinated hyphae which often collapse on drying; gleba black with yellowish septa, fundamental tramal tissue of more slender, smaller-celled prosenchyma, cavities filled with spores embedded in a gel; basidia clavate, evanescent, mostly 4-spored; spores (8–) 12–16 (–17) × (5.5–) 6–8 (–8.5) μ, obovoid with more or less acute apex, approaching citriform, thick-walled, smooth, very often uniguttulate, dark brown when mature.

Under hardwoods. Central and western Europe, New York, Kentucky, Oregon, and New Zealand. April to October.

The specimen (Zeller Herb. 2338) collected by Dr. Helen M. Gilkey along Greecy Creek, Benton Co., Oregon, differs enough from *M. ambiguus* for us to refer it here with some doubt. The peridium in the one fructification has an outer white layer

(50–60 μ thick) which darkens when bruised as described for *M. aureus*. The inner peridium is dark brown (150–170 μ thick). The spores are as in *M. ambiguus*, but the cavities are filled with a meshy growth of hyphae bearing the basidia with no evidence of gelification.

GERMANY: Preussen, Neu Schöneberg bei Berlin, *F. Klotzsch*, type of *Hyperrhiza liquaminosa* (Kew, Paris); Marburg, *R. Hesse*, 1885 (Farlow).

ENGLAND: Bristol, *C. E. Broome 355* (Brown Univ.); King's Lynn, *C. B. Plowright 503* (Brit. Mus., Stanford).

FRANCE: *L. Quélet* (Upsala); Seine, Bois de Boulogne, July 9, 1843, *L. Tulasne* (Paris).

ITALY: near Milano, *C. Vittadini* (Brit. Mus.).

NEW YORK: Syracuse, *L. H. Pennington* (Lloyd Mus. 87, and Dodge).

KENTUCKY: High Ridge, *C. O. Mattingly & F. T. McFarland* (Zeller).

OREGON: Benton County, Alsea Road, *H. P. Barss* (Zeller 681), *H. M. Gilkey* (Dodge, and Zeller 2338, 2803, 2805); Corvallis, *L. M. Boozer* (Dodge and Zeller 2285); Kings Valley, *S. M. Zeller 8187* (Zeller); Sulphur Springs, *H. M. Gilkey* (Zeller 6816).

NEW ZEALAND: Canterbury, Oxford, *G. Archer* (Cunningham 576, and Dodge); Wellington, *G. H. Cunningham*, 1928 (Dodge and Zeller); *Helen K. Dalrymple* (Lloyd Mus. 3, and Dodge).

1a. var. EURYSPERMUS Zeller & Dodge, Ann. Mo. Bot. Gard. **22**: 373. 1935.

Type: in Zeller and Dodge Herbaria.

Fructifications globose to irregular, up to 3.5 cm. in diameter, snuff-brown to bister, not changing on drying, surface smooth, dull, fibrils few, concolorous, not extending halfway up, not distinctly radicate, adnate-appressed; peridium thick, tough, 320–400 μ thick, of dark-brown hyphae with thin walls, somewhat vesiculose, variable in size, closely stupose; gleba with white partitions (drying yellowish) and coal-black cavities, gelatinous, cavities up to 3 mm. thick, filled with spores at maturity; septa variable in thickness, hyaline, of small hyphae up to 2.5 μ in diameter; basidia with long slender (2.5 μ) pedicels of odd lengths, tips pyriform, 5×7 μ, 4-spored, sterigmata short, up to 3 μ long; spores ellipsoid to citriform, black, 10–11 $\times$ 7.5–9 μ (usual mature spore 11×8.5 μ); odor of Rhenish wine.

In strawberry patch. Oregon and California. March to April.

There were 37 fruiting bodies in the type collection. The odor is distinctive. The variety may be distinguished from the

typical species by the large cavities, white septa, the color of peridium, and more abundant spores.

OREGON: Polk County, Rickreall, *Etta Neiderheiser*, type (Zeller 2660, and Dodge); Benton County, Corvallis, *L. M. Boozer* (Zeller 2346), *S. M. Zeller 7059* (Zeller).

CALIFORNIA: Santa Clara County, Call of the Wild, *H. E. Parks 137* (Univ. Cal. and Dodge).

2. MELANOGASTER MACROSPORUS Velenovsky, České Houby, 808. 1922.

Type: location unknown to us.

Fructifications tuberiform, fleshy, size of a walnut or even larger, brown when young, becoming dark horsechestnut-brown, soft, elastic, surface dull, thickly covered with long black fibrils; peridium very thin, black, not separable; gleba of black cavities with either yellowish or whitish septa, when ripe becoming gelatinous, blackish with yellowish veins; spores obovate-ellipsoid, narrower at the base, attached with 3–4 small bodies, reddish-brown, smooth, 15–18 μ long; odor very fetid.

In leaf humus of broad-leaved trees in summer, around Chuchle, common, in Trnova, Bechovice, and Karlstein. It seems to me that our fungus is *M. variegatus* Vitt. which is very often described in Germany and is quite common in other places. The spores appear ellipsoidal, 6×10 μ; either this size is wrong or our fungus is a new species. I have examined the spores very carefully from all points of view. —Velenovsky.

The following description is based on Oregon material which agrees closely enough with the above description to refer it here temporarily, pending opportunity to study the type:

Fructifications up to $12 \times 8 \times 6$ cm. (weight 270 g. when fresh), drying russet to Mars brown and black; peridium duplex, outer layer about 140 μ thick, composed of loosely woven, periclinal, dark brown, thick-walled hyphae 7 μ in diameter, about 50 μ thick, of slender, gelified hyphae continuous with the septa; gleba black, mottled by white septa which are 90 μ thick, highly gelified; basidia evanescent; spores broadly obovoid, 12–15 $\times$ 8–11 μ, dark brown; odor of spoiled silage or of onions without tear-producing qualities.

In duff under conifers, especially hemlock. Oregon. September.

OREGON: Clackamas County, on trail to Paradise Park from Twin Bridges Forest Camp, *S. M. Zeller 7759, 8230* (Dodge and Zeller); Lane County, Belknap Springs, *S. M. Zeller & G. R. Hoerner* (Zeller 8241).

3. MELANOGASTER **intermedius** (Berkeley) Zeller & Dodge, comb. nov.

Melanogaster ambiguus var. *intermedius* Berkeley, Ann. & Mag. Nat. Hist. I. **13**: 352. 1844.

Type: in Broome Herb. at Brit. Mus. and Tulasne Herb. at Paris.

Fructifications 2–4.5 cm. in diameter, subglobose to reniform, fibrils plentiful below, at a definite place of attachment, surface even to undulating, tomentulose, very dark reddish-brown when fresh, becoming blackish where bruised, drying Prout's brown to mummy-brown; peridium 125–160 μ thick, light yellow to brownish near the exterior, stupose, of hyphae with vesiculose cells, homogeneous, but loosely woven at the surface with some erect hyphae giving the tomentulose character, distinct from the tramal tissue; gleba slaty-black, slightly lined or streaked with thin septa, of hyaline (dilute yellowish) gelified hyphae, cavities filled with spores in a gel; spores dark, mostly obovoid, obtuse, smooth, very rarely somewhat fusiform, tip subacute, 11–13 × 7.4–8 μ; odor strong, offensive, suggesting asafoetida.

Under hardwoods. England and central California.

ENGLAND: Wiltshire, Spye Park, *C. E. Broome* (Brit. Mus. and Paris).

CALIFORNIA: *H. E. Parks, 551, 1123, 1124;* Santa Clara County, Alma, *H. E. Parks 7, Z29, Z328, 405;* Saratoga, Boys' Outing Farm, *H. E. Parks 366;* Brookdale, *H. E. Parks 2162bis;* Guadaloupe Mines, *H. E. Parks Z3, Z7, Z25, Z349, 145, 381, 412, 416;* highway to Watsonville, *H. E. Parks 3307;* Del Norte County, Crescent City, *H. E. Parks 2862;* Humboldt County, Trinidad, *H. E. Parks 4122, 4436, 4443* (all Univ. Cal. and Dodge).

4. MELANOGASTER TUBERIFORMIS Corda in Sturm, Deutschl. Fl. III. **11**: 1. 1831.

Hyperrhiza tuberiformis Rabenhorst, Deutschl. Krypt. Fl. **1**: 292–293. 1844.

Illustrations: Corda in Sturm, Deutschl. Fl. III. **11**: *pl. 1.*

Type: Portions in Berkeley Herb. at Kew and Tulasne Herb. at Paris.

Fructifications 1.5–7 cm. in diameter when fresh, drying 1–

2 cm. (in material examined), subspherical, bay or reddish-fuscous drying Rood's brown to Vandyke brown; fibrils rare, black, appressed, basal; peridium stupose, amber to darker, 100–185 μ thick; gleba black with white or slightly yellowish, inconspicuous septa, prosenchymatous, cavities very irregular; basidia evanescent, usually 8-spored; spores obovoid, sometimes pyriform, very dark brown, smooth, 10–11.5 × 5.5–7 μ.

Under *Pinus, Erica, Quercus.* Central Europe and western North America. June to August.

CZECHOSLOVAKIA: near Praha, *Corda,* type (Kew and Paris); Böhmerwald, *E. Soehner 774* (Soehner and Dodge).

GERMANY: Spiegelslust, *R. Hesse* (Farlow).

FRANCE: Alsace, Ballon, *L. Quélet* (Upsala).

IDAHO: Priest Lake, *C. V. Piper* (Lloyd Mus. 6164).

OREGON: Benton County, Corvallis, *S. M. Zeller 7760* (Zeller).

CALIFORNIA: no locality nor collector (Univ. Cal. 552, and Dodge); Santa Clara County, Saratoga, *H. E. Parks 968* (Univ. Cal. and Dodge); Marin County, Mill Valley, *H. W. Harkness 5* (Stanford).

5. MELANOGASTER MICROSPORUS Velenovsky, České Houby, 809. 1922.

Type: location unknown to us.

In some respects similar to *M. rubescens* but it is larger, up to 8 cm. in diameter, without odor or with weak odor of meat. Spores very small, ellipsoidal, pointed on both ends, 4–5 μ, very thick-walled, light yellow.

In leaf mould in woods in Tuchomeric. July, 1918, *J. Lissal.* —Velenovsky.

Mattirolo, Beitr. Krypt.-Fl. Schweiz (Contr. Fl. Critt. Sviss.) 8²: 37–39. 1935, described a fungus as *M. microsporus* without reference to the previous use of the name by Velenovsky. His description follows:

Fructifications irregularly globose, size of a hazel nut, yellow-umber; peridium 150 μ thick, of three layers, the outer forming a tomentum, the middle deeply colored, of slender crowded hyphae, the inner layer hyaline, thicker, pseudoparenchymatous; gleba chestnut to fuliginous; basidia clavate, 4-spored; spores ellipsoidal, 3–4 × 2 μ, similar to those of *Rhizopogon rubescens.*

Under chestnut and pine. Rodero. Como Province.

6. Melanogaster Broomeianus Berkeley in Tulasne, Ann. Sci. Nat. Bot. II. **19**: 377. 1843; Ann. & Mag. Nat. Hist. I. **13**: 353. 1844.

Melanogaster variegatus var. *Broomeianus* Tulasne, Fung. Hypog. 93. 1851.

Tuber moschatum Sowerby, English Fung. *pl. 426*. 1815.—*non al.*

Illustrations: Tulasne, Ann. Sci. Nat. Bot. II. **19**: *pl. 18, f. 23*.

Fructifications subglobose to irregularly lobed, often coalescing when cespitose, 2–4 cm. in diameter; surface ochraceous then Dresden brown with a flesh tint, becoming blackish where handled, drying tawny-olive to warm sepia, appressedly tomentulose; brownish fibrils below; peridium variable in thickness, 50–200 μ thick (mostly 50–100 μ), of stupose prosenchyma with large vesiculose cells, yellow-amber to darker toward the exterior, extending as fundamental tissue into the trama; gleba sooty-black, gelified, tramal septiments white to creamy, of subgelatinous hyaline hyphae, cavities filled with spores in a gel; spores light brown, narrowly oblong, broadly truncate below, (5–) 6–8.4 (–11) × (2.5–) 3.5–4.0 (–4.5) μ; odor of coffee grounds.

Under hardwood trees. July to February. Europe, Michigan, Indiana, and Oregon.

Close to *M. rubescens* in spore characters, but the spores are darker and definitely truncate below. Peanut-shaped spores are seldom found in this species, but even so they retain the truncate character.

Exsiccati: Berkeley, British Fungi, 285.

U. S. S. R. [Kurland]: Lesten, *F. Bucholtz* (Farlow); Kuruka, Ternomorek, *F. Bucholtz* (Farlow); Moskva, Ocfalfsbebe, *F. Bucholtz* (Farlow); Mikhailovskoe, *Bucholtz*, Aug. 4, 1899 (Farlow); Ucrania, *Czernaiev* (Upsala).

Sweden: Upland, Upsala, Karolinaparken, *E. P. Fries*, 1853 (Upsala); *Th. M. Fries*, 1877, 1883 (Upsala); *Seth Lundell*, 1930 (Upsala and Dodge); *Harry Smith*, 1930 (Upsala and Dodge); Valby, Lidehall, *C. J. Cederström*, 18–10–91 (Upsala); Skåne, Ramlösa, *E. Melin* (Upsala).

Austria: Tirol, Füssen, *J. R. Weir 22,291* (Dodge).

Germany: Würzburg, *E. Soehner 1033* (Soehner and Dodge).

Switzerland: Neuchatel, *P. Konrad* (Lloyd Mus. 050, and Dodge); Genève, Miolan, *J. Müller* (Lloyd Mus. 05915, Dodge, and Stanford, ex herb. G. Winter).

ITALY: Como, Rodero, *O. Mattirolo,* Aug. and Oct. 1900 (Lloyd Mus. 081, 03709, Dodge); near Milano, *no collector* (Stanford, ex herb. G. Winter); Trentino, *G. Bresadola* (Upsala).

FRANCE: Alsace, *L. Quèlet* (Paris); Eure, Andelys, *G. Malençon* (Dodge); Loiret, Port pres Gien, *L. Tulasne,* Oct. 1843 (Paris); Seine-et-Marne, Vincennes, *L. Tulasne* (Paris); Versailles, *L. Tulasne* (Paris).

ENGLAND: Wiltshire, Rudloe, *C. E. Broome,* Oct. 11, 1842 (Brit. Mus., and Brown Univ.); without locality, *Berkeley,* British Fungi, 285.

MICHIGAN: Ann Arbor, *L. E. Ekvall 19* (Univ. Mich.); Saginaw Forest, *C. H. Kauffman 22* (Univ. Mich.); School Girls Glen, *A. H. Smith* (Univ. Mich.).

INDIANA: Lafayette, Happy Hollow, *H. S. Jackson* (Dodge, and Zeller 2806).

OREGON: Benton County, Corvallis, *S. M. Zeller 1787, 1898, 2242* (Zeller); Wren, *L. M. Boozer* (Zeller 855); Lincoln County, Waldport, *S. M. Zeller 4996* (Zeller).

7. MELANOGASTER RUBESCENS (Vittadini) Tulasne, Fung. Hypog. 96. 1851.

Octaviania rubescens Vittadini, Monogr. Tuberac. 18. 1831.

Hyperrhiza rubescens Rabenhorst, Deutschl. Krypt.-Fl. **1**: 293. 1844.

Bondatia oleodora Lespiault, herb. nom.

Melanogaster nauseosus Coker & Couch, Gast. Eastern U. S. & Canada, 39. 1928.

Type: in Broome Herb. at Brit. Mus., Berkeley Herb. at Kew, and Tulasne Herb. at Paris. The type of *M. nauseosus* from Univ. North Carolina Herb.

Fructifications subglobose to elongate, irregularly sulcate, 1.5–3 cm. in diameter; surface tomentulose, even to reticulately ridged, light brownish when fresh, drying raw umber or darker; fibrils absent; peridium spongy, stupose, homogeneous, darker brown toward outer surface, drying 100–200 μ thick, distinct from tramal tissues; gleba moist, bluish-white when fresh, reddening and yellowing when freshly cut, drying brownish-black; septa broad, variable, cinnamon-buff; cavities rounded, not crowded, at first filled with dark claret-brown or darker spore masses, later becoming hollow, due to the relatively few spores scattered through the cavity gel; basidia clavate, unevenly distributed on the branching hyphae of the cavities; spores oblong-fusiform to ovoid-ellipsoid, or curved, somewhat irregular (often the shape of the fruit of *Arachis hypogaea*), 8–9.6 (–11.8) × 5.5–6.5 μ, light yellow, pellucid.

Southwestern Europe and eastern North America. July to November.

The specimen from Italy collected by Mattirolo differs from the other material of this species in having long narrow spores which measure 11–13 × 3.5–4 μ. It is with some hesitation that we have referred this specimen to *M. rubescens* (Vitt.) Tul.

The specimen from Ithaca, in alcohol, shows a peridium 650–750 μ thick, drying as thin as the peridium in the type.

ITALY: Como, Rodero, *O. Mattirolo,* Oct. 1905 (Dodge); Lombardia, near Milano, *C. Vittadini,* type (Paris, Kew, and Brit. Mus).

FRANCE: Lot-et-Garonne, Nerac, *Lespiault (Bondatia oleodora* herb nom., Paris).

NEW YORK: Ithaca, Beebe Lake, *H. H. Whetzel* (Atkinson Herb. at Cornell 13679, Dodge, and Zeller 1446).

PENNSYLVANIA: Mt. Pocono, *Schweinitz 2210* (sub *Rhizopogon aestivus* in Curtis Herb. at Farlow).

NORTH CAROLINA: Orange County, Chapel Hill, *J. N. & E. R. Couch* (type of *M. nauseosus,* Univ. N. C. 8281); Watauga County, Blowing Rock, *Coker et al.* (Univ. N. C. 5804).

ALABAMA: Sepsly, Payne's Mills, *P. P. Payne* (Lloyd Mus. 041).

8. MELANOGASTER **Parksii** Zeller & Dodge, sp. nov.

Type: Univ. Cal., Dodge, and Zeller Herbaria.

Fructificationes irregulares vel subsphaericae, 2–4 cm. diametro, fibrillae basi prominentes, brunneae nigrescentes, siccatae "Dresden brown" vel "Mars brown," obscuriores contusae, superficie aequo vel undulato, tomentuloso vel glabro; peridium prosenchymaticum, cellulis magnis spongiosis contextum, dilute luteum, externe obscurius, 300–480 μ crassitudine; gleba "Brussels brown" vel "warm buff" siccata, locellis in centro fructificationis subcavis; basidia non visa; sporae late obovoideae vel subsphaeroideae, dilute brunneae, sub lente pellucidae, 8–9.6 × 6.7–7.7 μ.

Fructifications irregular to subspherical, 2–4 cm. in diameter, dark brown to black, drying Dresden brown to Mars brown, darker where bruised, surface even or undulating, tomentulose to glabrous, basal fibrils prominent; peridium spongy, prosenchymatous, of large cells, light yellow, darker toward the peridium, 300–480 μ thick; gleba Brussels brown [dry], central cavities more or less hollow when dry with whitish or warm buff, gelified septa; basidia not seen; spores broadly obovoid to subspheroid, light brown, pellucid, 8–9.6 × 6.7–7.7 μ; odor pungent, spreading.

Deeply buried under leaves of *Quercus agrifolia.* California. April.

CALIFORNIA: Santa Clara County, Call of the Wild, *H. E. Parks 136a* (Univ. Cal., Dodge, and Zeller 1412); Guadaloupe Mines, *H. E. Parks 136,* type (Univ. Cal., Dodge, and Zeller 1655).

9. MELANOGASTER MOLLIS Lloyd, Myc. Notes 65: 1047. 1921 (see also p. 1065).

Illustrations: Lloyd, Myc. Notes 65: *f. 1939.*

Type: In Lloyd Mus., Dodge, and Zeller Herbaria.

Fructifications subglobose, collapsing at maturity, 2.5–3 cm. in diameter, drying Dresden brown to mummy-brown, pruinose to smooth where rubbed, distinct fibrils below; peridium thin, 80–130 μ thick, simplex, stupose, hyaline with brownish exterior; gleba in general black, drying hollow, tramal tissues whitish, then gelatinizing, prosenchymatous, basidia-bearing cavities filled with the deliquescent hyphae, basidia, and spores; spores small, dark brown, ellipsoid, smooth, 5.5–6.7 × 2–3.7 μ; odor disagreeable, rancid.

In black vegetable humus, hypogeous or emersed, among greasewood.

Melanogaster mollis Lloyd (except for *M. microsporus)* has the smallest spores of any known species. In the type collection the fructifications are extremely mature, with the gleba becoming deliquescent, drying with large hollows.

WYOMING: [Fremont County, Meeteetse, 6700 feet alt.], *Simon Davis,*[1] type (Lloyd Mus. 041, Dodge, and Zeller).

PORTUGAL: *J. Rick* (Lloyd Mus. 05348, and Dodge).

10. MELANOGASTER DURISSIMUS Cooke, Grevillea 7: 94. 1879.

Type: India, Chakrata, 8000′ north of Delhi, *Baden Powell.*

Fructifications compressed, sulcate, subspherical to reniform, smooth, up to 4 cm. in diameter, drying 2 × 1 × 1 cm., very hard, dark fuscous to sepia, cottony-furfuraceous, rubbing glabrous, no fibrils; peridium stupose, 90–115 μ thick, amber; gleba black with buff-white septa of close gelified pros-

[1] Lloyd did not record the data on this specimen, and the late Mrs. E. B. Blackford assured Dodge that she has been unable to locate a duplicate in Simon Davis' collections but she found notes for *Calvatia defodiodis* Lloyd from this locality, and it is probable that all of his collections from Wyoming came from the same locality.

enchyma; basidia evanescent; spores 6–8 × 4–5 μ, ellipsoid, very truncate at base, smooth, dark brown, exospore not conspicuous.

British India. November to February.

Baden Powell, the collector of the type, notes that this species is cooked and eaten by the natives, who report that chewing a little piece keeps off thirst in crossing high passes. The natives report it common in the hills of Kangra and in the Upper Chenab valley.

BRITISH INDIA: Chakrata, *B. Powell*, type (?); Simla, *J. M. Clark*, 7 Feb. 1879 (Brit. Mus. and Kew); *J. H. Burhill*, Nov. 8, 1902 (Lloyd Mus. 7331, com. E. J. Butler 14945).

11. MELANOGASTER VARIEGATUS (Vittadini) Tulasne, Ann. Sci. Nat. Bot. II. **19**: 377. 1843.

Octaviania variegata Vittadini, Monogr. Tuberac. 16. 1831.

?Tuber moschatum Bull. Champ. **1**: 79. 1789.

Hyperrhiza variegata Rabenhorst, Deutschl. Krypt.-Fl. **1**: 293. 1844.—*non al.*

Illustrations: Vittadini, Monogr. Tuberac. *pl. 3, f. 4;* Bull. Champ. **1**: *pl. 479.*

Type: della Pistola and along R. Lambro near Milano, Lombardia, *Vittadini.* Specimens sent by Vittadini in Sprague Collection at Harvard Univ., in Berkeley Herb. at Kew, and in Paris (com. Ardissone).

Fructifications rounded, irregular, the size of a hen's egg or fist, drying 2 cm. in greatest diameter, smooth, ochraceo-ferrugineous drying Verona brown, fibrils basal, fuscous; peridium stupose, 100–160 μ thick, amber-yellowish, extending as fundamental tissue into the trama; gleba yellowish-ashy at first, becoming black, with thin yellow-orange septa, cavities subpentagonal; basidia evanescent; spores ellipsoidal, very dark brown, 7.5–10 × 5–7.5 μ, smooth.

Under *Quercus* and *Cistus monspeliensis*. Northern Italy, Algeria, and California. August to December.

It is with some hesitation that we have referred *Parks Z22* to this species, owing to its texture resembling *Hymenogaster*, and to the absence of gel filling the cavities.

ITALY: Lombardia, *C. Vittadini,* type (Paris, com. Ardissone, Kew, and Farlow); agro panormilano, *Inzenga* (det. *Tuber Borchii,* Paris).

ALGERIA: Alger, *Durieu de Maisonneuve* (Paris).

CALIFORNIA: Santa Clara County, Guadaloupe Mines, *H. E. Parks 958* (Univ. Cal. and Dodge); Saratoga, *H. E. Parks Z22* (Univ. Cal., Dodge, and Zeller); Marin County, San Rafael, *H. E. Parks 2059* (Univ. Cal).

DOUBTFUL SPECIES

MELANOGASTER SARCOMELAS (Vittadini) Tulasne, Fung. Hypog. 97. 1851.

Octaviania sarcomelas Vittadini, Monogr. Tuberac. 16. 1831.

Hyperrhiza sarcomelas Rabenhorst, Deutschl. Krypt.-Fl. **1**: 293. 1944.

Type: Lombardia, *Vittadini,* not seen.

Fructifications small, irregular; peridium smooth, without rooting appendages; gleba very black, uniform in color; cells regular, contents gelified, filled with spores; spores ovoid, smooth, somewhat larger. Strong odor of ink. Fungus the size and form of a seed of *Faba,* with a thin peridium; base hardly distinguishable. Cavities rhomboidal or pentagonal, septa ashy, pellucid, opaque in center. When dry contracting into a solid perennial mass.—Vittadini.

A careful study of the original descriptions of Vittadini's species suggests that *M. sarcomelas* may be a synonym of *M. tuberiformis* Corda. In spite of searches by Tulasne, Mattirolo, and Lloyd, the type of this species has not been found.

MELANOGASTER ODORATISSIMUS (Vitt.) Tulasne, Fung. Hypog. 95–96. 1851.

Octaviania odoratissima Vittadini, Monogr. Tuberac. 19. 1831.

Hyperrhiza odoratissima Rabenhorst, Deutschl. Krypt.-Fl. **1**: 293. 1844.

Type: two fructifications from oak woods across the Po near Milano, *Vittadini,* April, probably lost.

Fructifications subspherical, sub-smooth, golden-rufous, with basal appendage. Gleba tough, pulpy, rufous-brown with septa; cavities not conspicuous, never empty; spores ovoid, umber. Odor of *Hyacinthus botryoides.* Fructifications the size of a chestnut; peridium with rooting fibrils as in *M. variegatus,* golden at first, then rufous;

gleba suggesting the pulp of red beets; cavities not very distinct; spores rare.—Vittadini.

Hesse, 'Die Hypogaeen Deutschlands' **1**: 64–65, *pl. 4, f. 10–14, pl. 8, f. 8.* 1891, has referred here material collected at Michelbach near Marburg, in 1884, but we have been unable to see this material. He describes it as follows:

Fructifications spherical, from size of a large hazel-nut to that of a sparrow egg, golden-yellow becoming deep red-brown, smooth, odor of *Hyacinthus botryoides;* peridium not easily separable from the gleba, composed of gelified hyphae, becoming deep reddish-brown; septa at first golden, becoming reddish; clamp connections prominent in the mycelium of the cavities bearing the basidia, which are mostly 8-spored; spores almost ovoid [figures show them ellipsoid to almost allantoid], brown, size not given, but if magnification of figures is correct spores about 7–8 × 4–5 μ.

There seems little to distinguish Hesse's concept of *M. odoratissimus* from *M. Broomeianus* Berk.

Bullardia inquinans Junghuhn, Linnaea **5**: 408. 1830.

Argylium inquinans Wallroth, Fl. Cryptog. Germ. **2**: 873. 1833.

Hyperrhiza inquinans Rabenhorst, Deutschl. Krypt.-Fl. **1**: 292. 1844.

Illustrations: Junghuhn, Linnaea **5**: *pl. 6, f. 15.*

Type: Germany: between Rammelburg and Klaus, *F. Junghuhn,* not seen.

Fructifications up to the size of a walnut, irregular, gibbous, smooth; peridium thin, sometimes ruptured at maturity; fibrils sparse, appressed; gleba black; septa white, composed of branched, loosely woven hyphae; basidia scattered throughout the cavities; spores black. Odor sweet, pleasant, almost aromatic; taste very sweet.—Junghuhn.

Under *Corylus Avellana* L. Germany. September.

While there seems no doubt that the above description refers to a species of *Melanogaster,* it is too brief and generalized to refer definitely to a species. It is probably not *M. variegatus,* to which it has been generally referred, as that Mediterranean

species is not known north of the Alps. It is much more probably *M. tuberiformis* or *M. Broomeianus*.

MELANOGASTER TUBEROSUM (Fr.)

Polysaccum tuberosum Fries, Syst. Myc. 3: 55. 1829; Linnaea 5: 695. 1830.

Lycoperdoides tuberosum, ferrugineum, arrhizon, pulpa nigra, Micheli, Nova Pl. Gen. 219. 1729.

Hyperrhiza tuberosa Fries, Ind. Syst. Myc. 102. 1832; Summa Veg. Scand. 437. 1849.

cf. Th. M. Fries, Svensk Bot. Tidskr. 3: 293. 1909.

Illustrations: Micheli, Nova Gen. Pl. *pl. 98, f. 2.*

Type: "In pratis calcareis," Malmoe, Sweden, along with *Bovista suberosa.* Angelin:

> Fructifications without roots, round, irregular, often oblong, suggesting a small tuber of *Solanum,* the size of a walnut *(Juglans),* soft when young, becoming hard; peridium coriaceous, ferrugineous, smooth, almost pruinose under a lens, not dehiscent; gleba with white or yellow septa, cavities very black, large, round or irregular, producing a black viscid ink with a very foul odor, filled with spores when mature; no capillitium.—Fries.

Since *M. Broomeanus* Berk. is the only species of this genus so far found in Sweden, of which we have seen specimens, it is likely that *M. tuberosum* may be the same fungus. However, we prefer not to reduce *M. Broomeanus* to synonymy until we have had an opportunity to study the type, if it still survives.

MELANOGASTER AUREUS (Vittadini) Tulasne, Fung. Hypog. 97. 1851.

Octaviania aurea Vittadini, Monogr. Tuberac. 20. 1831.

Hyperrhiza aurea Rabenhorst, Deutschl. Krypt.-Fl. 1: 293. 1844.

Illustrations: Vittadini, Monogr. Tuberac. *pl. 3, f. 14.*

Type: in forest on hill near La Stradella, near Milano, summer, *C. Vittadini,* apparently lost.

> Fructification oblong, reniform, rooting at the base, peridium smooth, at first whitish. Gleba hard at first, golden, with white veins (septa) variegated, then soft, blackening, somewhat hollow.

Odor pleasant. Fungus size of a filbert, peridium thin, becoming fuscous at the touch, with a radiciform appendage. Cavities not numerous, rounded or elongate, suggesting the pores of *Boletus*, golden-shining within. Septa thick, whitish-citrine. Cut gleba becoming greenish, but at maturity breaking down into a blackish sporiferous pulp.—Vittadini.

EXCLUDED SPECIES

Melanogaster Wilsonii Lloyd, Myc. Notes 68: 1176, 1923, is RHIZOPOGON **Wilsonii.** Zeller & Dodge, comb. nov.

Melanogaster carolinensis (Bosc) DeToni in Sacc. Syll. Fung. 7: 167. 1888.

Uperhiza Bosc, Ges. Naturf. Freunde Berlin Mag. 5: 88, *pl. 6, f. 62.* 1811.

Uperhiza carolinensis Nees ab Esenbeck, Syst. d. Pilze 1: 159. *pl. 15, f. 146.* 1816.

Hyperrhiza caroliniensis Sprengel, Syst. Veg. 4: 416. 1827.

Uperrhiza Boscii Schweinitz, Syn. Am. Bor. 255. 1834; Lloyd, Myc. Notes 30: 395. 1908. Curtis states that the Schweinitz specimen is a bad Scleroderma? from Mt. Pocono, Pa.

Type: Carolina, *Bosc;* probably lost.

A careful study of the original description and figures suggests *Scleroderma* sp. but in the absence of the type its identity remains doubtful.